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1           1.    For use in transforming colors between color  
2   imaging systems, a color mapping method comprising:  
3            using forward transformation profiles that  
4   characterize the color imaging systems to generate  
5   respective sets of device-independent color values for the  
6   color imaging systems;  
7            calculating color conversions by recursively  
8   reducing differences between the sets of device-independent  
9   color values; and  
10           constructing a color map describing a relationship  
11   between the color imaging systems using the color  
12   conversions.

1           2.    A color mapping method, according to claim 1,  
2   further comprising recursively reducing differences between  
3   black channel information.

1           3.    A color mapping method, according to claim 1,  
2   further comprising using an error function for calculating  
3   the color conversions.

1           4.    A color mapping method, according to claim 1,  
2   further comprising configuring at least one of the profiles

3 to account for certain perceptual effects on color  
4 appearance.

1 5. A color mapping method, according to claim 1,  
2 wherein the color map comprises at least one of the  
3 following: a lookup table, and an equation.

1 6. A color mapping method, according to claim 1,  
2 further comprising:

3 storing the color map;

4 detecting respective types of color imaging  
5 devices between which a color transformation is to be  
6 performed; and

7 in response to the detected types, selecting a  
8 stored color map.

1 7. For use in transforming colors between source  
2 and destination color imaging systems, a color mapping  
3 method comprising:

4 using profiles that characterize the color imaging  
5 systems to generate device-independent color values for the  
6 source color imaging system, the device-independent color

7 values having a same dimensionality as the source color  
8 imaging system;  
9 using the profiles to perform a color conversion  
10 for converting the device-independent color values to  
11 device-dependent values of the destination color imaging  
12 system; and  
13 using the color conversion to define a color map  
14 for transforming colors between the color imaging systems.

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1 8. A color mapping method, according to claim 7,  
2 wherein the color conversion is performed at least twice.

1 9. A color mapping method, according to claim 7,  
2 further comprising:

3 using the color conversion to evaluate its  
4 accuracy at least once; and

5 revising the color conversion at least once to  
6 improve its accuracy.

1 10. For use in transforming colors between source  
2 and destination color imaging systems, a color mapping  
3 method comprising:

1           (a) using profiles characterizing the color  
2 imaging systems to generate device-independent color values  
3 for the source color imaging system, the device-independent  
4 color values having a same dimensionality as the source  
5 color imaging system;

6           (b) using the profiles to perform a color  
7 conversion for converting the device-independent color  
8 values to device-dependent values of the destination color  
9 imaging system;

10           (c) using the color conversion to improve the  
11 accuracy of the color conversion relative to a quality  
12 threshold;

13           (d) returning to step (c) until the color  
14 conversion satisfies the quality threshold; and

15           (e) using the color conversion to define a color  
16 map for transforming colors between the color imaging  
17 systems.

1           11. For use in transforming colors between color  
2 imaging systems, a color mapping arrangement comprising:

3           means for using forward transformation profiles  
4 that characterize the color imaging systems to generate

5    respective sets of device-independent color values for the  
6    color imaging systems;  
7           means for calculating color conversions by  
8    recursively reducing differences between the sets of device-  
9    independent color values; and  
10           means for constructing a color map describing a  
11   relationship between the color imaging systems using the  
12   color conversions.

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1           12. For use in transforming colors between first  
2   and second color imaging systems respectively using first  
3   and second color coordinate systems, a color mapping method  
4   comprising:  
5           (a) generating first device-independent color  
6   coordinates as a function of color coordinates in the first  
7   color coordinate system;  
8           (b) estimating preliminary color coordinates in  
9   the second color coordinate system;  
10           (c) generating second device-independent color  
11   coordinates as a function of the preliminary color  
12   coordinates;

13 (d) adjusting the preliminary color coordinates  
14 to reduce an error between the first and second device-  
15 independent color coordinates;

16 (e) returning to step (a) until the error  
17 satisfies a quality threshold; and

18 (f) constructing a color map describing a  
19 relationship between the first and second color imaging  
20 systems as a function of the adjusted color coordinates.

09536366-032700 1 13. A color mapping method, according to claim  
2 12, further comprising using the color coordinates in the  
3 first color coordinate system to estimate the preliminary  
4 color coordinates.

1 14. For use in transforming colors between color  
2 imaging systems, a color mapping arrangement comprising:

3 a computer arrangement, programmed to

4 use forward transformation profiles that  
5 characterize the color imaging systems to generate  
6 respective sets of device-independent color values for the  
7 color imaging systems,

8                   calculate color conversions by recursively  
9   reducing differences between the sets of device-independent  
10 color values, and  
11                   construct a color map describing a  
12 relationship between the color imaging systems using the  
13 color conversions; and  
14                   a memory, configured and arranged to store the  
15 color map.

1                   15. A color mapping arrangement, according to  
2 claim 14, wherein the computer arrangement is further  
3 programmed to use an error function for calculating the  
4 color conversions.

1                   16. A color mapping arrangement, according to  
2 claim 14, wherein the computer arrangement is further  
3 programmed to configure at least one of the profiles to  
4 account for certain perceptual effects on color appearance.

1                   17. A color mapping arrangement, according to  
2 claim 14, wherein the computer arrangement is further  
3 programmed to construct at least one of the following: a  
4 lookup table, and an equation.

1           18. A color mapping arrangement, according to  
2 claim 14, wherein the computer arrangement is further  
3 programmed to  
4           detect respective types of color imaging devices  
5 between which a color transformation is to be performed, and  
6           in response to the detected types, select a stored  
7 color map.

1           19. For use in transforming colors between color  
2 imaging systems, a data storage medium storing a computer-  
3 executable program that, when executed,

4           uses forward transformation profiles that  
5 characterize the color imaging systems to generate  
6 respective sets of device-independent color values for the  
7 color imaging systems;

8           calculates color conversions by recursively  
9 reducing differences between the sets of device-independent  
10 color values, and

11           constructs a color map describing a relationship  
12 between the color imaging systems using the color  
13 conversions.

1           20. A data storage medium, according to claim 19,  
2 wherein the computer-executable program recursively reduces  
3 differences between black channel information.

1           21. A data storage medium, according to claim 19,  
2 wherein the computer-executable program uses an error  
3 function for calculating the color conversions.

1           22. A data storage medium, according to claim 19,  
2 wherein the computer-executable program configures at least  
3 one of the profiles to account for certain perceptual  
4 effects on color appearance.

1           23. A data storage medium, according to claim 19,  
2 wherein the computer-executable program generates at least  
3 one of the following: a lookup table, and an equation.

1           24. A data storage medium, according to claim 19,  
2 wherein the computer-executable program:

3                 stores the color map;

4                 detects respective types of color imaging devices

5                 between which a color transformation is to be performed; and

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6                    in response to the detected types, selects a  
7   stored color map.

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